



MORPHOMETRIC CHARACTERISTICS OF THE THYMUS IN METABOLIC SYNDROME

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Annotation: Metabolic syndrome is a symptom complex that causes complex metabolic disorders in various organs and structures and is characterized by abdominal obesity, insulin resistance, arterial hypertension, and dyslipidemia. The study is experimental and aims to investigate the morphofunctional and reactive changes in the thymus in laboratory animals with induced metabolic syndrome. The study will include laboratory animals (rats) divided into two groups: a control group and a group with induced metabolic syndrome. As a result, the obtained morphometric indicators make it possible not only to verify the physiological norm but also to predict the direction of pathomorphological changes under the influence of anthropogenic chemical factors.

Keywords: metabolic syndrome, thymus, immunity, abdominal obesity, incidental involution.

Introduction. According to the World Health Organization (WHO), between 40 and 60 million people in Europe suffer from metabolic syndrome (MS). Metabolic syndrome is a symptom complex that causes complex metabolic disorders in various organs and structures and is characterized by abdominal obesity, insulin resistance, arterial hypertension, and dyslipidemia.

Materials and methods — the study is experimental and aimed at examining the morphofunctional and reactive changes in the thymus in laboratory animals with induced metabolic syndrome. The study will include laboratory animals (rats) divided into two groups: a control group and a group with induced metabolic syndrome. The MS model will be created using a high-fat diet and physical inactivity. For the experiment, 91 white rats of different sexes with a body weight of 210–230 g, at three different ages: 8, 12, and 16 weeks, were selected. Subsequently, morphometric studies were carried out in all groups.

Results. An experimental model of metabolic syndrome was created using experimental animals. To achieve this, the experimental animals were fed a diet high in carbohydrates and fats, and their physical activity was restricted. In a microslide prepared from the thymus of experimental animals with the



so-called experimental metabolic syndrome, morphological signs of random thymic involution were detected; these included a significant reduction in the size of the gland's lobes and infiltration of adipose tissue in the peripheral part, where adipocytes took the place of the organ's functional structures. The main indicator of the organ's involution is a reduction in the total area of the gland's lobes by almost 20%, while changes in the structural zones indicate an uneven progression of the pathological process. In the cortical tissue of the thymus, the area decreased by 33.92%, while in the medullary tissue it increased by 24.57%, as this process is of a compensatory-destructive nature and is associated with the migration of surviving cells from the cortex to the center of the lobule, as well as the development of stromal oedema.

Conclusions. Thus, these changes confirm the data on the structural restructuring of the organ, in which a decrease in the volume of lymphopoiesis is accompanied by hyperplasia of the medullary regulatory structures of the thymus.

As a result, the obtained morphometric indicators make it possible not only to verify the physiological norm but also to predict the direction of pathomorphological changes under the influence of anthropogenic chemical factors.

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